Name:

MTH133

Unit 1-2 Individual Project (IP3 in Unit 2)VC

1. The following graph shows the growth of the median home value in a particular region of the United States starting in 1996. The graphs starts in 1996 and shows the trend through the year 2000; therefore *x* = 0 represents the year 1996 and x = 4 is 2000.

X – axis (horizontal) = years starting from 0 = 1996 and increasing by 1.0 years
Y – axis (vertical) = price in $ amounts



You can click and drag the graph to enlarge it if it will make it easier for you to read.

a) List the coordinates of any two points on the graph in (*x, y*) form.

(\_\_\_, \_\_\_),(\_\_\_, \_\_\_)

b) Find the slope of this line:

 Answer:

Show your work here:

c) Find the equation of this line in slope-intercept form.

 Answer:

 Show or explain your work here:

d) If the trend for the growth in the median home value continued, what would be its value in the year 2007? Show how you obtained your answer using the equation you found in part c).

 Answer:

 Show or explain your work here:

2. Suppose that the width of a rectangle is three feet shorter than length and that the perimeter of the rectangle is 84 feet.

a) Set up an equation for the perimeter involving only *L*, the length of the rectangle.

Answer:

b) Solve this equation algebraically to find the length of the rectangle. Find the width as well.

 Answer: Length \_\_\_\_\_\_, Width \_\_\_\_\_\_

 Show your work here:

3) John has a choice of using one of two parking garages when he visits downtown:

Option1: $8 an hour for the first two hours, then $2 and hour for each hour more than 2; or

Option 2: $10 for the first hour and $2.50 for each hour more than one.

 Let *x* = total hours parked.

1. Write a mathematical model representing the total parking cost, *C*, in terms of *x* for the following (assume John is parking for more than 2 hours):

Option 1: *C*=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Option 2: *C*=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. John plans to spend the day downtown (more than 2 hours), how many total hours would John have to park for the cost of option 1 to be less than option 2. Set up an inequality and show your work algebraically using the information in part a. Don’t forget about the daily fee in Option 1 (it’s a four day proposition!). Do not assume an eight our workday. Any number of hours per day is possible.

Answer:

 Show your work here:

4) Use the graph of *y = x2* – *6x* to answer the following:

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a) Without solving the equation (or factoring), determine the solutions to the equation  *x2 – 6x = 0* using only the graph.

Answer:

Explain how you obtain your answer(s) by looking at the graph:

b) Does this function have a maximum or a minimum?

Answer:

Explain how you obtain your answer by looking at the graph:

c) What is the equation of the line (axis) of symmetry for this graph?

Answer:

d) What are the coordinates of the vertex in (*x, y*) form?

Answer:

5) The cost function for the Recklus Hang gliding Service is C(x) = 0.4x2 - fx + m, where f represents the average fuel cost for a customer’s daily excursion and m represents the monthly hanger rental. Also, C represents the monthly cost in dollars of the small business where x is the number of flight excursions facilitated in that month.

a) If $60 is estimated to be the average fuels cost (f), and the monthly hanger rental is $3,000; write an equation for the profit, P, in terms of x.

 Typing hint: Type *x*-squared as *x*^2

Answer:

b) What is the cost when 40 flight excursions are sold in a month?

 Answer:

 Show your work here:

c) How many flight excursions must be sold in order to minimize the cost? Show your work algebraically. Trial and error is not an appropriate method of solution – use methods taught in class.

 Answer:

 Show your work here:

d) What is the minimum cost?

 Answer:

 Show your work here:

6. Graph the equations by completing the tables and plotting the points. You may use Excel or another web-based graphing utility.

a) y = -½ x + 3
Use the table; find at least 3 points using any values for x.

|  |  |
| --- | --- |
| x | y |
| -2 |  |
| 0 |  |
| 4 |  |

b) y = x2 – 4x + 5

Use the values of x provided in the table.

|  |  |
| --- | --- |
| x | y |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |